

WHAT IS CLAIMED IS:

1. A thermocouple measurement circuit comprising:
a thermocouple input for sensing a temperature at a measuring point;
a compensation circuit for compensating thermocouple effects of junctions of the thermocouple; and
an instrumentation amplifier for summing an output of the thermocouple and an output of the compensation circuit and outputting a voltage indicative of the temperature sensed.
2. The thermocouple measurement circuit of claim 1, wherein the output of the compensation circuit is a reference voltage for the output of the instrumentation amplifier.
3. The thermocouple measurement circuit as in any preceding claim, wherein the compensation circuit is a cold junction compensator.
4. The thermocouple measurement circuit as in any preceding claim, wherein the compensation circuit further includes an amplifier coupled to the cold junction compensator for outputting a high impedance output from the compensation circuit.
5. The thermocouple measurement circuit as in any preceding claim, further comprising a filtering circuit for eliminating noise from the thermocouple input.

6. The thermocouple measurement circuit as in any preceding claim, further comprising an analog-to-digital converter for converting the output voltage to a digital signal.

7. The thermocouple measurement circuit as in any preceding claim, further comprising an offset circuit coupled to the thermocouple input for generating an out of range thermocouple output when the thermocouple input is not connected.

8. The thermocouple measurement circuit as in any preceding claim, further comprising:

- a first switch coupled between the thermocouple input and the instrumentation amplifier for supplying a thermocouple test voltage to the instrumentation amplifier during a test mode; and

- a second switch coupled between the compensation circuit and the instrumentation amplifier for supplying a compensation test voltage to the instrumentation amplifier during the test mode.

9. An electrosurgical generator comprising:

- a radio frequency (RF) output circuit for outputting RF energy;

- a control circuit for controlling the output of the RF output circuit; and

- a thermocouple measurement circuit for determining a temperature at a measuring point, the thermocouple measuring circuit comprising:

- a thermocouple input for sensing a temperature at the measuring point;

- a compensation circuit for compensating thermocouple effects of junctions of the thermocouple; and

an instrumentation amplifier for summing an output of the thermocouple and an output of the compensation circuit and outputting a voltage indicative of the temperature sensed to the control circuit.

10. The electrosurgical generator as in claim 9, wherein the output of the compensation circuit is a reference voltage for the output of the instrumentation amplifier.

11. The electrosurgical generator as in claim 9 or 10, wherein the compensation circuit is a cold junction compensator.

12. The electrosurgical generator as in claim 9, 10 or 11, wherein the compensation circuit further includes an amplifier coupled to the cold junction compensator for outputting a high impedance output from the compensation circuit.

13. The electrosurgical generator as in claim 9, 10, 11 or 12, further comprising a filtering circuit for eliminating noise from the thermocouple input.

14. The electrosurgical generator as in claim 9, 10, 11, 12 or 13, further comprising an analog-to-digital converter for converting the output voltage to a digital signal.

15. The electrosurgical generator as in claim 9, 10, 11, 12, 13 or 14, further comprising an offset circuit coupled to the thermocouple input for generating an out of range thermocouple output when the thermocouple input is not connected.

16. The electrosurgical generator as in claim 9, 10, 11, 12, 13, 14 or 15, further comprising:

a first switch coupled between the thermocouple input and the instrumentation amplifier for supplying a thermocouple test voltage to the instrumentation amplifier during a test mode; and

a second switch coupled between the compensation circuit and the instrumentation amplifier for supplying a compensation test voltage to the instrumentation amplifier during the test mode.

17. An electrosurgical system comprising:

an electrosurgical generator for outputting radio frequency (RF) energy;

an electrosurgical instrument coupled to the electrosurgical generator for applying the RF energy to an operative site; and

a thermocouple measurement circuit for determining a temperature at the operative site, the thermocouple measuring circuit comprising:

a thermocouple input for sensing the temperature at a measuring point of the electrosurgical tool;

a compensation circuit for compensating thermocouple effects of junctions of the thermocouple; and

an instrumentation amplifier for summing an output of the thermocouple and an output of the compensation circuit and outputting a voltage indicative of the temperature sensed to the electrosurgical generator, wherein the electrosurgical generator controls the output energy based on the sensed temperature.

18. The electrosurgical system as in claim 17, wherein the electrosurgical instrument comprises at least one end effector member and the thermocouple input is located in the at least one end effector member.

19. The electrosurgical system as in claim 17 or 18, wherein the output of the compensation circuit is a reference voltage for the output of the instrumentation amplifier.

20. The electrosurgical system as in claim 17, 18 or 19, wherein the compensation circuit is a cold junction compensator.